

## **3.15 Parcel 61 – Bldg 1075 – Patterson Army Health Clinic**

### **3.15.1 Site Description**

Parcel 61 is located in the south-central portion of the MP and encompasses Patterson Army Health Clinic (Bldg 1075) and the surrounding land. Bldg 1075 was constructed in 1961 to house Patterson Army Hospital. Bldg 1075 has been used continuously since that time, although it was downgraded to a health clinic in 1995. Operations in the 1960s, 1970s, and 1980s included X-ray processing and laboratory operations. Operations in the building extensively used mercury-containing equipment, developing chemicals, and other chemicals/waste associated with medical operations.

During the 2006 VSIs, numerous floor drains were observed in the basement that lead to the pneumatic sewage ejector and into the sanitary sewer (34). Additional information pertaining to this parcel can be found in Section 4.3.2.1.3, Section 4.3.2.1.4, Section 4.4.4.2, Table 4-3, Section 4.4.4.3, Table 4-4, Section 5.1.1.2.1, Section 5.1.9.1, Section 5.12, and Section 5.13.5 of the Phase I ECP (1).

### **3.15.2 Previous Investigations**

One former UST associated with Bldg 1075 was removed under the FTMM UST Management Program and is summarized within the FTMM Phase I ECP Report (1). No previous investigations have been conducted in relation to former operations in Bldg 1075.

### **3.15.3 Site Investigation Sampling**

A site reconnaissance and reviews of historical site plans, sanitary plans, and stormwater management plans were conducted to evaluate potential discharge locations throughout the parcel. It was determined that stormwater from Bldg 1075 discharges northwest of Bldg 975. In order to determine if any contamination exists due to previous operations conducted at Bldg 1075, the following soil and sediment sampling was performed in Parcel 61.

#### **Surface Soil Investigation**

Surface soil samples were collected in December 2007 in Parcel 61. A total of four surface soil samples were collected from one hand augered location (P61SS-1), and three Geoprobe® boring locations (P61SS-2;3;4). Samples were located along the southeast and northeast corners of Bldg 1075 (**Figure 3.15-1**). Sample P61SS-1 was collected in a grass-covered area near a door at the southeastern corner of Bldg 1075. Samples P61SS-2;3 were collected near the loading docks of Bldg 1075. Sample P61SS-4 was collected near the basement door at the northeast corner of Bldg 1075. Samples were taken in order to determine if any contamination exists from former hospital operations that took place in Bldg 1075. Surface soil samples for non-VO analysis were collected from the 0- to 6-inch interval bgs. For surface soil samples

located in paved areas, non-VO surface soil samples were collected from the 0- to 6-inch interval directly below the pavement sub-base. Surface soil samples collected for VO analysis were collected from the 18- to 24-inch interval bgs. No visual or olfactory evidence of soil contamination was noted.

### Sediment Investigation

Sediment samples were collected in December 2007 to evaluate Parcel 61. A total of four sediment samples were collected from two distinct hand augered borings to investigate potential historic discharges to stormwater from Bldg 1075. Sample 61SD-1 was collected at the stormwater outfall, MP17, located along the southeast bank of Oceanport Creek directly north to Bldg 975. This outfall was identified on facility engineering drawings to be the outfall at which stormwater from the area of Bldg 1075 is ultimately discharged. Sample 61SD-2 was collected downstream on the southeast bank of the tributary to Oceanport Creek (**Figure 3.15-1**). Sediment samples for non-VO and VO analysis were collected from the 0- to 6-inch interval bgs and the 18- to 24-inch interval bgs. No visual or olfactory evidence of impacted sediment was noted.

**Table 3.15-1** presents a summary of all field activities, and all sample locations are provided on **Figure 3.15-1**. A summary of sampling activities, including sample IDs, collection dates, and analytical parameters, is provided in **Table 3.15-2**.

**Table 3.15-1**  
**Parcel 61 Sampling Location, Rationale and Analytical**

Sample Location	Sample Media	Sample Location Rationale	Analytical Suite
61SD-1 and 2 (2 samples)	Sediment	Sediment samples were collected from the 0- to 6-inch bgs interval to investigate potential historic discharges to stormwater from Bldg 1075. 61SD-1 was collected directly at stormwater outfall MP 17, and 61SD-2 was collected downstream.	TCL+30 (w/o pesticides), TAL Metals
61SD-1D and 2D (2 samples)	Sediment	Sediment samples were collected from the 18- to 24-inch interval bgs to investigate potential historic discharges to stormwater from Bldg 1075.	TCL+30 (w/o pesticides), TAL Metals
61SS-1	Surface soil	A soil sample was collected from the 18- to 24-inch bgs interval located near a door at the southeastern corner of Bldg 1075 to investigate potential historical discharges from previous hospital operations. The 0- to 18-inch bgs interval contained sub-base that was likely associated with former pavement in the area.	TCL+30 (w/o pesticides), TAL Metals, cyanide
61SS-2 61SS-3	Surface soil	Soil samples were collected from the 18- to 24-inch bgs interval at loading docks of Bldg 1075 to investigate potential historical discharges from previous hospital operations and loading/unloading of chemicals and supplies in the area of the loading dock. This area is overlain by pavement and sub-base from 0 to 18 inches bgs.	TCL+30 (w/o pesticides), TAL Metals, cyanide

Sample Location	Sample Media	Sample Location Rationale	Analytical Suite
61SS-4	Surface soil	A soil sample was collected from the 0- to 6-inch bgs interval near basement doors at northeast corner of Bldg 1075 to investigate potential historical discharges from previous hospital operations.	TCL+30 (w/o pesticides), TAL Metals, cyanide

### 3.15.4 Site Investigation Results

#### Soil Investigation Results

Soil samples were for TCL+30 (minus pesticides), TAL metals, and cyanide.

As presented in **Table 3.15-3**, a total of 19 B/Ns and 18 metals were detected in Parcel 61 soil samples. Of the 19 B/Ns detected, three (benzo[a]anthracene, benzo[b]fluoranthene, and benzo[a]pyrene) were detected at concentrations exceeding NJDEP NRDCSCC and their respective MPBC in one surface soil sample (P61SS-1) and are considered COCs in soil at Parcel 61. Soil sample P61-SS1 was collected at a depth of 1.5 to 2.0 ft bgs (1.5 ft of former sub-base was present at this location suggesting the area was possibly covered with asphalt in the past). All 18 metals identified in soil were detected below NJDEP NRDCSCC. Cyanide was not detected in soil at Parcel 61.

#### Sediment Investigation Results

Sediment samples were analyzed for TCL+30 (without pesticides) and TAL metals. The tributary to Oceanport Creek in which sediment samples were collected is a tidal water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the Marine/Estuarine Sediment Screening Guidelines-ER-L.

As presented in **Table 3.15-4**, a total of one VO, 16 B/Ns, and 18 metals were detected in Parcel 61 sediment samples. The one VO (toluene) was detected in one sample (P61SD-1D) at a concentration below the ER-L. Of the 16 B/Ns detected, 11 (acenaphthene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[k]fluoranthene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene) were detected in one or more of the four sediment samples at concentrations that exceeded the ER-L. With the exception of benzo(k)fluoranthene, concentrations of all these B/Ns also exceeded their respective MPBC. Acenaphthene, benzo[a]anthracene, benzo[a]pyrene, fluorene, phenanthrene, and pyrene were detected above the ER-M. Of the 18 metals detected, four (arsenic, chromium, copper, and lead) were detected at concentrations that exceeded the ER-L. None of the metals were detected above the ER-M.

Arsenic was detected above the ER-L of 8.2 mg/kg in two sediment samples collected in Parcel 61 at concentrations of 13.3 mg/kg in sample P61-SD2 and 14.1 mg/kg in sample P61-SD1D. The arsenic concentrations did not exceed the MPBC of 14.5 mg/kg.

Chromium was detected above the ER-L of 81 mg/kg in one sediment sample collected in Parcel 61 at a concentration of 86 mg/kg in sample P61-SD2. The chromium concentration did not exceed the MPBC of 88.1 mg/kg.

Copper was detected above the ER-L of 34 mg/kg and the MPBC of 48.4 mg/kg in one sediment sample collected in Parcel 61 at a concentration of 48.7 mg/kg in sample P61-SD1D.

Lead was detected above the ER-L of 47 mg/kg and the MPBC of 64.1 mg/kg in one sediment sample collected in Parcel 61 at a concentration of 114 mg/kg in sample 61SD-1D.

Metals and B/Ns are considered COCs in sediment at Parcel 61.

### **3.15.5 Summary and Conclusions**

Three B/Ns (benzo[a]anthracene, benzo[b]fluoranthene, and benzo[a]pyrene) were detected at concentrations exceeding the NJDEP NRDCSCC and MPBC in one surface soil sample, P61-SS1. Further evaluation of B/Ns identified above criteria in surface soil sample P61-SS1 is recommended in Parcel 61. The B/N COCs identified in soil at Parcel 61 are PAHs. PAHs are contained in asphalt and are commonly detected in soil under asphalt pavement. Re-collection of the sample at this location will be conducted as part of the further evaluation to determine if the PAHs detected in soil are attributable to the former asphalt pavement.

Two metals (copper and lead) and ten B/Ns (acenaphthene, anthracene, benzo[a]anthracene, benzo[a]pyrene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene) were detected in sediment at concentrations greater than the NJDEP Marine/Estuarine Sediment Screening Guidelines-ER-L and MPBC. Sediment at Parcel 61 is recommended for further evaluation as part of a facility-wide baseline ecological evaluation.

**Table 3.15-2  
Parcel 61 Sample and Analytical Summary**

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	BIN+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SD	HAND AUGER	P61-SD1	12/20/07	12:40	0.0	0.5		X	X	X	X				Associated field and trip blanks collected with Parcel 39 cancelled by lab (except for cyanide).
SD	HAND AUGER	P61-SD1D	12/20/07	12:50	1.0	1.5		X	X	X	X				Associated field and trip blanks collected with Parcel 39 cancelled by lab (except for cyanide).
SD	HAND AUGER	P61-SD2	12/20/07	13:00	0.0	0.5		X	X	X	X				Associated field and trip blanks collected with Parcel 39 cancelled by lab (except for cyanide).
SD	HAND AUGER	P61-SD2D	12/20/07	13:10	1.0	1.5		X	X	X	X				Associated field and trip blanks collected with Parcel 39 cancelled by lab (except for cyanide).
SOIL	HAND AUGER	P61-SS1	12/20/07	14:50	0.0	0.5			X	X	X	X			Associated field and trip blanks collected with Parcel 39 cancelled by lab (except for cyanide).
SOIL	HAND AUGER	P61-SS1	12/27/07	12:00	1.5	2.0		X							Associated trip blank collected with P27. No field blank or duplicate collected 12/27/07.
SOIL	HAND AUGER	P61-SS2	12/20/07	14:20	1.5	2.0		X	X	X	X	X			Associated field and trip blanks collected with Parcel 39 cancelled by lab (except for cyanide).
SOIL	HAND AUGER	P61-SS3	12/20/07	13:50	1.5	2.0		X	X	X	X	X			Associated field and trip blanks collected with Parcel 39 cancelled by lab (except for cyanide).
SOIL	HAND AUGER	P61-SS4	12/20/07	15:20	0.5	1.0			X	X	X	X			Associated field and trip blank collected with Parcel 39 cancelled by lab (except for cyanide). Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	HAND AUGER	P61-SS4	12/27/07	12:05	1.5	2.0		X							Associated trip blank collected with Parcel 27. No field blank or duplicate collected 12/27/07.

X = Sample analyzed for the indicated analytical parameter suite

**Table 3.15-3**  
**Fort Monmouth Phase II Site Investigation, Parcel 61**  
**Summary of Analytical Parameters Detected in Soil (mg/kg)**

Chemical	Sample ID:		Analytical Results			
	Lab ID:		P61-SS1	P61-SS2	P61-SS3	P61-SS4
	Date Sampled:		7055205	7055206	7055207	7055208
	Depth (ft. bgs):		12/20/2007	12/20/2007	12/20/2007	12/20/2007
	Depth (ft. bgs):		1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0
	NRDCCSCC <sup>2</sup>	IGWSCC <sup>3</sup>	Result	Result	Result	Result
<b>Semi-Volatiles</b>						
Acenaphthene	10000	100	<b>2.300</b>	1.100 U	1.100 U	1.200 U
Anthracene	10000	100	<b>2.500</b>	1.100 U	1.100 U	1.200 U
Benzo[a]anthracene	4	500	<b>4.600</b>	1.100 U	1.100 U	1.200 U
Benzo[a]pyrene	0.66	100	<b>3.700</b>	1.100 U	1.100 U	1.200 U
Benzo[b]fluoranthene	4	50	<b>5.800</b>	1.100 U	1.100 U	1.200 U
Benzo[g,h,i]perylene	NLE	NLE	<b>1.100 J</b>	1.100 U	1.100 U	1.200 U
Benzo[k]fluoranthene	4	500	<b>2.200</b>	1.100 U	1.100 U	1.200 U
Butyl benzyl phthalate	10000	100	1.100 U	1.100 U	1.100 U	<b>0.300 J</b>
Chrysene	40	500	<b>5.000</b>	1.100 U	1.100 U	1.200 U
Dibenzofuran	NLE	NLE	<b>1.200</b>	1.100 U	1.100 U	1.200 U
Di-n-butylphthalate	10000	100	<b>0.082 JB</b>	<b>0.093 JB</b>	<b>0.110 JB</b>	<b>0.250 JB</b>
bis(2-Ethylhexyl)phthalate	210	100	<b>0.270 J</b>	1.100 U	<b>0.130 J</b>	<b>1.300</b>
Fluoranthene	10000	100	<b>13.000</b>	1.100 U	1.100 U	<b>0.085 J</b>
Fluorene	10000	100	<b>1.600</b>	1.100 U	1.100 U	1.200 U
Indeno[1,2,3-cd]pyrene	4	500	<b>1.100 J</b>	1.100 U	1.100 U	1.200 U
2-Methylnaphthalene	NLE	NLE	<b>0.540 J</b>	1.100 U	1.100 U	1.200 U
Naphthalene	4200	100	<b>1.200</b>	1.100 U	1.100 U	1.200 U
Phenanthrene	NLE	NLE	<b>14.000 E</b>	1.100 U	1.100 U	1.200 U
Pyrene	10000	100	<b>12.000</b>	1.100 U	1.100 U	<b>0.094 J</b>
<b>Metals</b>						
Aluminum	NLE	NLE	<b>10100 B</b>	<b>10400 B</b>	<b>9320 B</b>	<b>10700 B</b>
Arsenic	20	NLE	<b>7.40</b>	<b>5.31</b>	<b>4.24</b>	<b>15.8</b>
Barium	47000	NLE	<b>26.7 B</b>	<b>20.2 B</b>	<b>23.2 B</b>	<b>148 B</b>
Beryllium	140	NLE	<b>0.972</b>	<b>0.558</b>	<b>0.574</b>	<b>0.849</b>
Cadmium	100	NLE	<b>0.546</b>	<b>0.237</b>	<b>0.0446</b>	<b>0.900</b>
Calcium	NLE	NLE	<b>1410 B</b>	<b>4290 B</b>	<b>550 B</b>	<b>2850 B</b>
Chromium (Total)	NLE	NLE	<b>73.6 B</b>	<b>54.2 B</b>	<b>84.7 B</b>	<b>73.3 B</b>
Cobalt	NLE	NLE	<b>2.45</b>	<b>3.15</b>	<b>1.07</b>	<b>0.755</b>
Copper	45000	NLE	<b>32.4 B</b>	<b>22.5 B</b>	<b>5.96 B</b>	<b>81.8 B</b>
Iron	NLE	NLE	<b>29300 B</b>	<b>28800 B</b>	<b>18000 B</b>	<b>36200 B</b>
Lead	800	NLE	<b>33.3</b>	<b>3.75</b>	<b>1.90</b>	<b>14.6</b>
Magnesium	NLE	NLE	<b>3110</b>	<b>3220</b>	<b>1450</b>	<b>2980</b>
Manganese	NLE	NLE	<b>84.5 B</b>	<b>112 B</b>	<b>55.6 B</b>	<b>118 B</b>
Mercury	270	NLE	<b>0.61</b>	0.103 U	0.104 U	<b>0.20</b>
Nickel (Soluble Salts)	2400	NLE	<b>6.50</b>	<b>10.7</b>	<b>4.01</b>	<b>6.47</b>
Potassium	NLE	NLE	<b>6140 B</b>	<b>2910 B</b>	<b>3270 B</b>	<b>4660 B</b>
Vanadium	7100	NLE	<b>52.6</b>	<b>76.2</b>	<b>78.3</b>	<b>61.7</b>
Zinc	1500	NLE	<b>74.7 B</b>	<b>44.4 B</b>	<b>25.4 B</b>	<b>290 B</b>

<sup>1</sup> NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

<sup>2</sup> NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

<sup>3</sup> NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.

(Surface soil compared to NRDCCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCCSCC).

**Table 3.15-4**  
**Fort Monmouth Phase II Site Investigation, Parcel 61**  
**Summary of Analytical Parameters Detected in Sediment (mg/kg)**

Chemical	Sample ID: Lab ID: Date Sampled: Depth (ft. bgs):		Analytical Results			
			P61-SD1	P61-SD1D	P61-SD2	P61-SD2D
			7055201	7055202	7055203	7055204
			12/20/2007	12/20/2007	12/20/2007	12/20/2007
	0.0-0.5	1.0-1.5	0.0-0.5	1.0-1.5		
ER-L <sup>1</sup>	ER-M <sup>2</sup>	Result	Result	Result	Result	
Volatiles						
Toluene	NLE	NLE	0.290 U	0.095 J	0.340 U	0.340 U
Semi-Volatiles						
Acenaphthene	0.016	0.500	1.200 U	0.210 J	1.600	7.600
Anthracene	0.085	1.1	0.160 J	0.800 J	0.290 J	0.340 J
Benzo[a]anthracene	0.261	1.6	0.490 J	2.000	0.740 J	0.660 J
Benzo[a]pyrene	0.430	1.6	0.430 J	1.800	0.650 J	0.580 J
Benzo[b]fluoranthene	NLE	NLE	0.990 J	3.000	1.000 J	0.880 J
Benzo[k]fluoranthene	0.240	NLE	1.200 U	1.300 U	0.380 J	0.310 J
bis(2-Ethylhexyl)phthalate	NLE	NLE	0.380 J	1.300 U	0.460 J	0.370 J
Chrysene	0.384	2.8	0.710 J	2.600	0.920 J	0.790 J
Dibenzofuran	NLE	NLE	1.200 U	1.300 U	1.400 U	0.420 J
Di-n-butylphthalate	NLE	NLE	0.280 JB	1.300 U	0.320 JB	1.400 U
Fluoranthene	0.600	5.1	1.300	4.500	1.700	1.700
Fluorene	0.019	0.54	1.200 U	0.560 J	0.140 J	0.200 J
4-Methylphenol	NLE	NLE	1.200 U	1.300	1.400 U	1.400 U
Naphthalene	0.16	2.1	1.200 U	0.280 J	1.400 U	1.400 U
Phenanthrene	0.240	1.5	0.680 J	1.500	1.200 J	1.100 J
Pyrene	0.665	2.6	1.500	7.200	2.200	1.800
Metals						
Aluminum	NLE	NLE	4390 B	9740 B	10000 B	3400 B
Arsenic	8.2	70	1.77	14.1	13.3	3.03
Barium	NLE	NLE	27.2 B	55.3 B	17.2 B	11.0 B
Beryllium	NLE	NLE	0.662	1.11	1.19	0.498
Cadmium	1.2	9.6	0.221	0.847	0.274	0.133
Calcium	NLE	NLE	553 B	938 B	1180 B	1170 B
Chromium (Total)	81	370	39.9 B	54.6 B	86.0 B	27.6 B
Cobalt	NLE	NLE	0.903	4.97	1.98	1.35
Copper	34	270	12.0 B	48.7 B	13.0 B	31.6 B
Iron	NLE	NLE	13000 B	20400 B	32300 B	13000 B
Lead	47	218	33.0	114	12.4	17.6
Magnesium	NLE	NLE	1820	2140	3910	1190
Manganese	NLE	NLE	13.0 B	29.8 B	62.6 B	40.9 B
Mercury	0.15	0.71	0.118 U	0.13	0.130 U	0.134 U
Nickel (Soluble Salts)	21	52	3.59	14.4	9.41	4.73
Potassium	NLE	NLE	4050 B	3980 B	6470 B	1970 B
Vanadium	NLE	NLE	24.8	41.7	49.9	20.7
Zinc	150	410	58.4 B	127 B	63.4 B	63.6 B

<sup>1</sup> NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Low, 1998.

<sup>2</sup> NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Medium, 1998.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

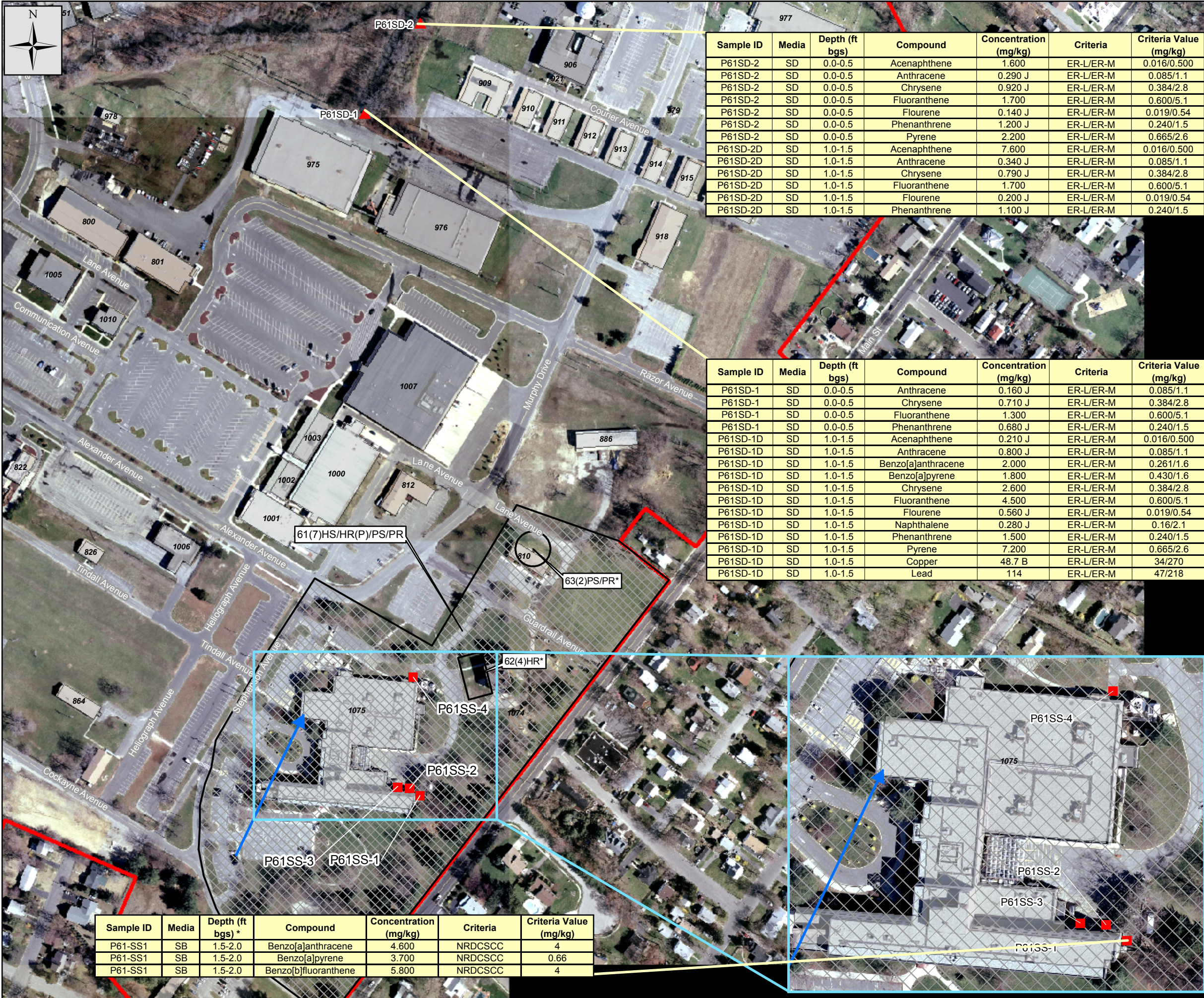
NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte detected.

Shaded = Concentration exceeds LEL.



Sample ID	Media	Depth (ft bgs) *	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P61-SS1	SB	1.5-2.0	Benzo[a]anthracene	4.600	NRDCSCC	4
P61-SS1	SB	1.5-2.0	Benzo[a]pyrene	3.700	NRDCSCC	0.66
P61-SS1	SB	1.5-2.0	Benzo[b]fluoranthene	5.800	NRDCSCC	4

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P61SD-2	SD	0.0-0.5	Acenaphthene	1.600	ER-L/ER-M	0.016/0.500
P61SD-2	SD	0.0-0.5	Anthracene	0.290 J	ER-L/ER-M	0.085/1.1
P61SD-2	SD	0.0-0.5	Chrysene	0.920 J	ER-L/ER-M	0.384/2.8
P61SD-2	SD	0.0-0.5	Fluoranthene	1.700	ER-L/ER-M	0.600/5.1
P61SD-2	SD	0.0-0.5	Flourene	0.140 J	ER-L/ER-M	0.019/0.54
P61SD-2	SD	0.0-0.5	Phenanthrene	1.200 J	ER-L/ER-M	0.240/1.5
P61SD-2	SD	0.0-0.5	Pyrene	2.200	ER-L/ER-M	0.665/2.6
P61SD-2D	SD	1.0-1.5	Acenaphthene	7.600	ER-L/ER-M	0.016/0.500
P61SD-2D	SD	1.0-1.5	Anthracene	0.340 J	ER-L/ER-M	0.085/1.1
P61SD-2D	SD	1.0-1.5	Chrysene	0.790 J	ER-L/ER-M	0.384/2.8
P61SD-2D	SD	1.0-1.5	Fluoranthene	1.700	ER-L/ER-M	0.600/5.1
P61SD-2D	SD	1.0-1.5	Flourene	0.200 J	ER-L/ER-M	0.019/0.54
P61SD-2D	SD	1.0-1.5	Phenanthrene	1.100 J	ER-L/ER-M	0.240/1.5

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P61SD-1	SD	0.0-0.5	Anthracene	0.160 J	ER-L/ER-M	0.085/1.1
P61SD-1	SD	0.0-0.5	Chrysene	0.710 J	ER-L/ER-M	0.384/2.8
P61SD-1	SD	0.0-0.5	Fluoranthene	1.300	ER-L/ER-M	0.600/5.1
P61SD-1	SD	0.0-0.5	Phenanthrene	0.680 J	ER-L/ER-M	0.240/1.5
P61SD-1D	SD	1.0-1.5	Acenaphthene	0.210 J	ER-L/ER-M	0.016/0.500
P61SD-1D	SD	1.0-1.5	Anthracene	0.800 J	ER-L/ER-M	0.085/1.1
P61SD-1D	SD	1.0-1.5	Benzo[a]anthracene	2.000	ER-L/ER-M	0.261/1.6
P61SD-1D	SD	1.0-1.5	Benzo[a]pyrene	1.800	ER-L/ER-M	0.430/1.6
P61SD-1D	SD	1.0-1.5	Chrysene	2.600	ER-L/ER-M	0.384/2.8
P61SD-1D	SD	1.0-1.5	Fluoranthene	4.500	ER-L/ER-M	0.600/5.1
P61SD-1D	SD	1.0-1.5	Flourene	0.560 J	ER-L/ER-M	0.019/0.54
P61SD-1D	SD	1.0-1.5	Naphthalene	0.280 J	ER-L/ER-M	0.16/2.1
P61SD-1D	SD	1.0-1.5	Phenanthrene	1.500	ER-L/ER-M	0.240/1.5
P61SD-1D	SD	1.0-1.5	Pyrene	7.200	ER-L/ER-M	0.665/2.6
P61SD-1D	SD	1.0-1.5	Copper	48.7 B	ER-L/ER-M	34/270
P61SD-1D	SD	1.0-1.5	Lead	114	ER-L/ER-M	47/218

LEGEND

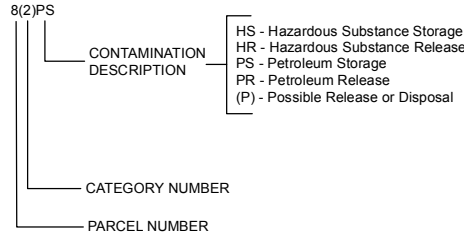
- Surface Soil Sample Location
- Sediment Sample Location
- Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and pre-existing IRP site groundwater potentiometric maps where available.
- Building
- Installation Boundary

ECP PARCEL CATEGORY DEFINITIONS

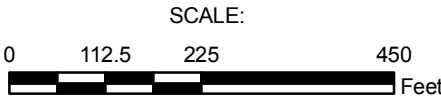
- Areas that are not evaluated or require additional evaluation.

\* Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in the Fort Monmouth Phase I ECP Report (January 2007).

BRAC PARCEL LABEL DEFINITIONS



\*\* Depth is from surface of paved area; soil collected from below subbase.



Base Realignment and Closure 2005



Shaw Environmental, Inc.

FIGURE 3.15-1

FORT MONMOUTH ECP  
SITE INVESTIGATION

PARCEL 61 SAMPLE LOCATIONS  
AND CONSTITUENTS OF CONCERN



MAIN POST  
FORT MONMOUTH  
NEW JERSEY

## **3.16 Parcel 69 – Bldg 900 – Former Vehicle Repair/Motor Pool**

### **3.16.1 Site Description**

Parcel 69, Bldg 900, is a former tactical motor pool. It is located in the southeastern portion of the MP and has been utilized for general storage for approximately the past 10 years. The building formerly contained a waste oil tank immediately outside the building that was connected by a fill pipe originating from inside the building (removed). A storm sewer inlet was observed in the parking lot in close proximity to the building during the 2006 VSIs. A boiler was formerly located outside the building. A 1993 USAEHA report cites a TCE parts cleaner and 500-gallon aboveground waste oil tank being present at the building at the time of the 1993 site visit (35). The tank has been removed from the building. All TCE parts cleaners were eliminated from use (MP and CWA) in February 1994 under Environmental Program Requirements Project FM0094F088.

Solvents were previously used for cleaning vehicle parts at various locations throughout FTMM. Both the military and the contractors operated solvent parts cleaners. These solvent parts cleaners consisted of a tank and sink with nozzle. The military used Super Agitine for its parts cleaners while the contractor used Siloo Tyme II. Each parts cleaner held about 30 gallons of fluid, which was reused until it needed changing. Fluid changes occurred every 4 months to every 3 years depending on location and usage (35).

Additional information pertaining to this parcel can be found in Section 4.3.2.1.7, Section 5.4, Section 5.4.2, and Appendix G of the Phase I ECP (1).

### **3.16.2 Previous Investigations**

Two former USTs associated with Bldg 900 have been removed under the FTMM UST Management Program and are summarized within the FTMM Phase I ECP Report (1). No previous investigations have been conducted in relation to former operations in Bldg 900.

### **3.16.3 Site Investigation Sampling**

Review of historical site plans, sanitary plans, and stormwater management plans as well as a site reconnaissance were conducted to evaluate potential discharge locations throughout the parcel. It was determined that stormwater from Bldg 900 discharges to Oceanport Creek northwest of Bldg 977 and north of Bldg 908. In order to determine the absence/presence of contamination from potential releases to the environment, the following soil sampling, sediment sampling, and groundwater sampling were conducted throughout Parcel 69.

## Geoprobe® Investigation

Soil and groundwater samples were collected in November 2007 in Parcel 69 in order to determine whether contamination exists from any previous discharges from a former waste oil AST or activities that occurred within Bldg 900. A total of four surface soil samples and five subsurface soil samples (including one duplicate sample) were collected from four distinct Geoprobe® borings (**Figure 3.16-1**). Three borings, P69SB1, 2, and 3, were located in the vicinity of the former waste oil AST. The other boring, P69SB-4, was located downgradient (north) of Bldg 900 to evaluate the absence/presence of contamination downgradient of the building. Surface soil samples for non-VO analysis were collected from the 0- to 6-inch interval bgs. For borings located in paved areas, non-VO surface soil samples were collected from the 0- to 6-inch interval directly below the pavement sub-base. Surface soil samples collected for VO analysis were collected from the 18- to 24-inch interval bgs. Subsurface soil samples were collected from the 6-inch interval directly above the water table. Field screening of soil boring cores were conducted using PID/FID instruments. No visual or olfactory evidence of soil contamination was noted.

A total of three groundwater samples (including one duplicate sample) were collected from two distinct temporary wells that were installed with the Geoprobe® rig. One temporary well, P69GW-1, was installed in an area of the former waste oil AST east of Bldg 900, and the other well, P69GW-4, was installed downgradient (north) of Bldg 900. Temporary wells were constructed of PVC and 5 ft of factory-slotted screen.

## Sediment Investigation

Sediment samples were collected in November 2007 in Parcel 69 in order to investigate any potential historic discharges to stormwater from Bldg 900. A total of five sediment samples (including one duplicate sample) were collected from two distinct hand augered borings located along the south bank of Oceanport Creek (**Figure 3.16-1**). One sample was collected directly at a stormwater outfall within Oceanport Creek upstream of Murphy Drive, and the other sample was collected at a stormwater outfall discharging to Oceanport Creek downstream of Murphy Drive. Sediment samples for non-VO and VO analysis were collected from the 0- to 6-inch and the 18- to 24-inch interval bgs. No visual or olfactory evidence of sediment contamination was noted.

**Table 3.16-1** presents a summary of all field activities, and all sample locations are provided on **Figure 3.16-1**. A summary of sampling activities, including sample IDs, collection dates, and analytical parameters, is provided in **Table 3.16-2**.

**Table 3.16-1**  
**Parcel 69 Sampling Location, Rationale and Analytical**

<b>Sample Location</b>	<b>Sample Media</b>	<b>Sample Location Rationale</b>	<b>Analytical Suite</b>
69SD-1 and 2 (2 samples)	Sediment	Sediment samples were collected from the 0- to 6-inch bgs interval to investigate potential historic discharges to stormwater from Bldg 900. Sample 69SD-1 was collected directly at a stormwater outfall within Oceanport Creek upstream of Murphy Drive. Sample 69SD-2 was collected from the stormwater outfall discharging to Oceanport Creek downstream of Murphy Drive.	TCL+30 (w/o pesticides), TAL Metals
69SD-1D and 2D (3 samples – includes 1 duplicate sample)	Sediment	Sediment samples were collected from the 18- to 24-inch interval bgs to investigate potential historic discharges to stormwater from Bldg 900.	TCL+30 (w/o pesticides), TAL Metals
69SS-1 through 69SS-4 (4 samples)	Surface soil	Soil samples were collected from the 0- to 6-inch bgs interval from Geoprobe® borings. The borings were located in the vicinity of the former waste oil AST (69GP-1), within the parking area directly outside Bldg 900 (69GP-2 and 69GP-3), and downgradient of Bldg 900 (69GP-4).	TCL+30 (w/o pesticides), TAL Metals, cyanide
69SB-1 through 69SB-4 (5 samples – includes 1 duplicate sample)	Subsurface soil	Soil samples were collected from the 6-inch interval directly above the water table (depths ranging from 3.0 to 8.5 ft bgs) from Geoprobe® borings. The borings were located in the vicinity of the former waste oil AST (69GP-1), within the parking area directly outside Bldg 900 (69GP-2 and 69GP-3), and downgradient of Bldg 900 (69GP-4). Field screening of the entire Geoprobe® soil core was conducted using PID and FID meters.	TCL+30 (w/o pesticides), TAL Metals, cyanide
49GW-1, 49GW-4 (3 samples – includes 1 duplicate sample)	Groundwater	Groundwater samples were collected from the area of the former waste oil AST (69GP-1) and downgradient of Bldg 900 (69GP-4).	TCL+30 (w/o pesticides/PCBs)

### 3.16.4 Site Investigation Results

#### Geoprobe® Investigation Results

Surface and subsurface soil samples were analyzed for TCL+30 (minus pesticides) and TAL metals. Groundwater samples were analyzed for TCL+30 (minus pesticides/PCBs).

## Soil

A summary of analytes detected in soil at Parcel 69 is presented in **Table 3.16-3**. Two VO's, five B/Ns, and 17 metals were detected in Parcel 69 soil. All constituents were detected below the NJDEP NRDCSCC. No COCs were identified in soil at Parcel 69.

## Groundwater

As shown in **Table 3.16-4**, a total of three VO's and one B/N were detected in Parcel 69 groundwater. One VO (PCE) was detected at a concentration that exceeds the NJDEP GWQC of 1.0 µg/L in a duplicate groundwater sample collected from temporary well P69GW-1 (1.02 µg/L). The concentration of PCE in the other sample collected at P69GW-1 was 0.97 µg/L. PCE was not detected in the downgradient groundwater sample (P69GW-4). The B/N bis(2-ethylhexyl)phthalate was detected at concentrations above the GWQC of 3 µg/L in sample P69GW-1 (8.54 µg/L) and the duplicate sample collected at this location P69GW-1DUP (3.08 µg/L). A commonly used plasticizer, bis(2-ethylhexyl)phthalate, is present in a wide variety of plastic products, is commonly detected in field and laboratory QC samples, and was detected in the field blank associated with the Parcel 69 groundwater samples. Therefore, it is not considered a COC in groundwater at Parcel 69. PCE is a COC in groundwater at Parcel 69.

## Sediment Investigation Results

Sediment samples were analyzed for TCL+30 (minus pesticides) and TAL metals. Oceanport Creek is a tidally influenced water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the NJDEP Marine/Estuarine Sediment Screening Guideline-ER-L.

As presented in **Table 3.16-5**, four VO's, eight B/Ns, and 20 metals were detected in Parcel 69 sediment samples. All four VO's were detected at concentrations below the ER-L. Of the eight B/Ns detected, seven (acenaphthene, anthracene, benzo[a]anthracene, chrysene, fluoranthene, phenanthrene, and pyrene) were detected at concentrations that exceeded ER-L values. With the exception of benzo(a)anthracene, concentrations of these B/Ns exceeded their respective MPBC. Acenaphthene and pyrene were detected at concentrations in excess of the ER-M. Of the 20 metals detected, nine (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) were detected at concentrations that exceeded ER-L values. Cadmium, lead, mercury, nickel, silver, and zinc were detected at concentrations above the ER-M.

Arsenic was detected above the ER-L of 8.2 mg/kg and the MPBC of 14.5 mg/kg in one sediment sample collected in Parcel 69 at a concentration of 36.2 mg/kg in sample 69SD-2A.

Cadmium was detected above the ER-L of 1.2 mg/kg and the ER-M of 9.6 mg/kg in one sediment sample collected in Parcel 69 at a concentration of 14.1 mg/kg (sample 69SD-

2A). No background concentration has been established for cadmium. There were no other detections of cadmium in sediment at Parcel 69.

Chromium was detected above the ER-L of 81 mg/kg in three sediment samples collected in Parcel 69 at concentrations ranging from 83.3 mg/kg in sample 69SD-1B-DUP to 345 mg/kg in sample 69SD-2A. The chromium concentration detected in sample 69SD-2A also exceeded the MPBC of 88.1 mg/kg.

Copper was detected above the ER-L of 34 mg/kg in three sediment samples collected in Parcel 69 at concentrations of 37.3 mg/kg (sample 69SD-1B), 38.6 mg/kg (sample 69SD-1B Duplicate), and 203 mg/kg in sample 69SD-2A. The copper concentration detected in sample 69SD-2A also exceeded the MPBC of 48.4 mg/kg.

Lead was detected above the ER-L of 47 mg/kg in two sediment samples collected in Parcel 69 at concentrations of 53.7 mg/kg in sample 69SD-1B Duplicate and 410 mg/kg in sample 69SD-2A (**Table 3.16-5**). The detection of lead in sample 69SD-2A is also above the ER-M and MPBC. Lead was detected below the ER-L at a concentration of 44.4 mg/kg in sample 69SD-1B.

Mercury was detected above the ER-L of 0.15 mg/kg and ER-M of 0.71 mg/kg in one sediment sample collected in Parcel 69 at a concentration of 0.83 mg/kg in sample 69SD-2A. The mercury concentration did not exceed the MPBC of 1.7 mg/kg. Mercury was not detected in the other sediment samples collected in Parcel 69.

Nickel was detected above the ER-L of 21 mg/kg and ER-M of 52 mg/kg in one sediment sample collected in Parcel 69 at a concentration of 53.1 mg/kg (sample 69SD-2A). The nickel concentration did not exceed the MPBC of 131 mg/kg.

Silver was detected above the ER-L of 1 mg/kg and ER-M of 3.7 mg/kg in one sediment sample collected in Parcel 69 at a concentration of 9.99 mg/kg (sample 69SD-2A). No background concentration has been established for silver. Silver was not detected in the other sediment samples collected in Parcel 69.

Zinc was detected above the ER-L of 150 mg/kg in two sediment samples collected in Parcel 69 at concentrations of 515 mg/kg in sample 69SD-2A and 176 mg/kg in sample 69SD-2B. The detection of zinc in sample 69SD-2A is also above the ER-M.

B/Ns and seven metals are COCs in sediment at Parcel 69.

### **3.16.5 Summary and Conclusions**

No COCs were identified in soil at concentrations greater than the NJDEP NRDCSCC or IGWSCC; therefore, NFA is recommended for soil within Parcel 69.

One COC, PCE, was detected slightly above the respective NJDEP GWQC in temporary well P69GW-1. Further evaluation of groundwater is recommended.

Six B/Ns COCs (acenaphthene, anthracene, chrysene, fluoranthene, phenanthrene, and pyrene) and seven metals COCs (arsenic, cadmium, chromium, copper, lead, silver, and zinc) were detected in sediment at concentrations greater than the NJDEP Marine/Estuarine Sediment Screening Guidelines-ER-L and MPBC. Sediment at Parcel 69 is recommended for further evaluation as part of a facility-wide baseline ecological evaluation.

**Table 3.16-2  
Parcel 69 Sample and Analytical Summary**

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	B/N+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
BLANK	TRIP	TRIP BLANK	11/20/07	-	--	--									Volatile samples were cancelled due to holding time. Resampled 12/17/07.
BLANK	TRIP	TRIP BLANK	12/17/07	-	--	--		X							
SOIL	GEOPROBE	P69-1-A	11/20/07	9:10	0.5	1			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-1-B	11/20/07	9:10	1.5	2.0									Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SOIL	GEOPROBE	P69-1-B	12/17/07	13:15	1.5	2.0		X							
SOIL	GEOPROBE	P69-1-C	11/20/07	9:20	7.0	7.5			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-1-C	12/17/07	13:30	7.0	7.5		X							Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-2-A	11/20/07	10:20	0.5	1.0			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-2-B	11/20/07	10:20	1.5	2.0									Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SOIL	GEOPROBE	P69-2-B	12/17/07	14:00	1.5	2.0		X							
SOIL	GEOPROBE	P69-2-C	11/20/07	10:35	7.0	7.5			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-2-C	12/17/07	14:15	7.0	7.5		X							Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-3-A	11/20/07	11:00	0.5	1.0			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.

**Table 3.16-2  
Parcel 69 Sample and Analytical Summary**

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	B/N+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SOIL	GEOPROBE	P69-3-B	11/20/07	11:00	1.5	2.0									Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SOIL	GEOPROBE	P69-3-B	12/17/07	14:45	1.5	2.0		X							
SOIL	GEOPROBE	P69-3-C	11/20/07	11:05	3.5	4.0			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-3-C	12/17/07	15:00	3.5	4.0		X							Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-4-A	11/20/07	11:45	0.5	1.0			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-4-B	11/20/07	11:45	1.5	2.0									Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SOIL	GEOPROBE	P69-4-B	12/17/07	15:30	1.5	2.0		X							
SOIL	GEOPROBE	P69-4-C	11/20/07	12:00	8.5	9.0			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-4-C	12/17/07	15:45	8.5	9.0		X							Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-4-C DUPLICATE	11/20/07	12:00	8.5	9.0			X	X	X	X			Volatile samples were cancelled due to holding time. Resampled 12/17/07. Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P69-4-C DUPLICATE	12/17/07	15:45	8.5	9.0		X							Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
BLANK	FIELD	FIELD BLANK	11/20/07	12:15	--	--			X	X	X	X			Semi-Volatile sample extracted for Base Neutrals only. No acids reported. Volatile samples were cancelled due to holding time. Resampled 12/17/07.
BLANK	FIELD	FIELD BLANK	12/17/07	17:00	--	--		X							

**Table 3.16-2  
Parcel 69 Sample and Analytical Summary**

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	B/N+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SD	HAND AUGER	P69-SD1-A	11/20/07	14:00	0.0	0.5			X	X	X				Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SD	HAND AUGER	P69-SD1-A	12/17/07	16:00	0.0	0.5		X							
SD	HAND AUGER	P69-SD1-B	11/20/07	14:10	1.5	2.0			X	X	X				Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SD	HAND AUGER	P69-SD1-B	12/17/07	16:15	1.5	2.0		X							
SD	HAND AUGER	P69-SD1-B DUPLICATE	11/20/07	14:10	1.5	2.0			X	X	X				Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SD	HAND AUGER	P69-SD1-B DUPLICATE	12/17/07	16:15	1.5	2.0		X							
SD	HAND AUGER	P69-SD2-A	11/20/07	14:50	0.0	0.5			X	X	X				Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SD	HAND AUGER	P69-SD2-A	12/17/07	16:30	0.0	0.5		X							
SD	HAND AUGER	P69-SD2-B	11/20/07	15:00	1.5	2.0			X	X	X				Volatile samples were cancelled due to holding time. Resampled 12/17/07.
SD	HAND AUGER	P69-SD2-B	12/17/07	16:45	1.5	2.0		X							
BLANK	TRIP	TRIP BLANK-AQ	11/21/07	8:30	--	--		X							
BLANK	FIELD	FIELD BLANK-AQ	11/21/07	9:30	--	--		X	X						Semi-volatiles extracted for Base Neutrals only. Recollected 11/27/07 for Acid Extractables.
GW	GEOPROBE	P-69-1	11/21/07	10:00	7.0	12.0		X	X						Semi-volatiles extracted for Base Neutrals only. Recollected 11/27/07 for Acid Extractables.
GW	GEOPROBE	P-69-1 DUPLICATE	11/21/07	10:00	7.0	12.0		X	X						Semi-volatiles extracted for Base Neutrals only. Recollected 11/27/07 for Acid Extractables.
GW	GEOPROBE	P-69-4	11/21/07	10:30	10.0	15.0		X	X						Semi-volatiles extracted for Base Neutrals only. Recollected 11/27/07 for Acid Extractables.
BLANK	FIELD	FIELD BLANK-AQ	11/27/07	8:30	--	--			X						
GW	GEOPROBE	P-69-1	11/27/07	9:00	7.0	12.0			X						
GW	GEOPROBE	P-69-1 DUPLICATE	11/27/07	9:00	7.0	12.0			X						
GW	GEOPROBE	P-69-4	11/27/07	9:30	10.0	15.0			X						

X = Sample analyzed for the indicated analytical parameter suite

Table 3.16-3  
Fort Monmouth Phase II Site Investigation, Parcel 69  
Summary of Analytical Parameters Detected in Soil (mg/kg)

Chemical	Sample ID: Lab ID: Date Sampled: Depth (ft. bgs):		Analytical Results											
			P69SB-1A	P69SB-1B	P69SB-1C	P69SB-1C	P69SB-2A	P69SB-2B	P69SB-2C	P69SB-2C	P69SB-3A	P69SB-3B	P69SB-3C	P69SB-3C
			7048003	7053903	7048005	7053904	7048006	7053905	7048008	7053906	7048009	7053907	7048011	7053908
			11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007
Chemical	Depth (ft. bgs):		0.5-1.0	1.5-2.0	7.0-7.5	7.0-7.5	0.5-1.0	1.5-2.0	7.0-7.5	7.0-7.5	0.5-1.0	1.5-2.0	3.5-4.0	3.5-4.0
	NRDCSCC <sup>2</sup>	IGWSCC <sup>3</sup>	Result	Result	Result		Result	Result	Result		Result	Result	Result	Result
Volatiles														
Acetone	1000	100	NT	0.410 B	NT	0.380	NT	0.590	NT	0.830	NT	0.860	NT	0.870
Methylene Chloride	210	1	NT	0.250 U	NT	0.270 U	NT	0.250 U	NT	0.260 U	NT	0.250 U	NT	0.250 U
Semi-Volatiles														
Diethyl phthalate	10000	50	1.000 U	NT	0.039 JB	NT	1.100 U	NT	1.100 U	NT	1.000 U	NT	1.100 U	NT
Di-n-butylphthalate	10000	100	1.100 B	NT	0.670 JB	NT	1.000 JB	NT	0.750 JB	NT	0.420 JB	NT	1.800 B	NT
Fluoranthene	10000	100	1.000 U	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	0.094 J	NT	1.100 U	NT
Phenanthrene	NLE	NLE	1.000 U	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	0.080 J	NT	1.100 U	NT
Pyrene	10000	100	1.000 U	NT	1.100 U	NT	1.100 U	NT	1.100 U	NT	0.170 J	NT	1.100 U	NT
Metals														
Aluminum	NLE	NLE	6760 B	NT	7300 B	NT	7890 B	NT	9440 B	NT	7880 B	NT	7170 B	NT
Arsenic	20	NLE	2.09	NT	0.586 U	NT	2.49	NT	1.98	NT	2.14	NT	1.09	NT
Barium	47000	NLE	23.0 B	NT	11.9 B	NT	21.5 B	NT	14.1 B	NT	28.0 B	NT	20.4 B	NT
Beryllium	2	NLE	0.768	NT	0.520	NT	0.827	NT	0.448	NT	0.885	NT	0.846	NT
Calcium	NLE	NLE	1230	NT	287	NT	1070	NT	247	NT	1420	NT	805	NT
Chromium (Total)	NLE	NLE	46.9	NT	55.8	NT	56.5	NT	44.1	NT	60.0	NT	56.2	NT
Cobalt	NLE	NLE	0.497	NT	0.536	NT	0.919	NT	0.352 U	NT	0.947	NT	0.690	NT
Copper	600	NLE	6.49 B	NT	7.33 B	NT	15.4 B	NT	6.41 B	NT	11.6 B	NT	7.12 B	NT
Iron	NLE	NLE	18600	NT	16500	NT	24700	NT	17600	NT	25100	NT	23600	NT
Lead	600	NLE	8.98 B	NT	5.58 B	NT	9.68 B	NT	4.20 B	NT	21.8 B	NT	11.1 B	NT
Magnesium	NLE	NLE	2200	NT	1910	NT	2960	NT	1650	NT	2960	NT	2580	NT
Manganese	NLE	NLE	36.7	NT	22.2	NT	43.8	NT	32.9	NT	46.2	NT	30.7	NT
Mercury	270	NLE	0.107 U	NT	0.102 U	NT	0.095 U	NT	0.107 U	NT	0.103 U	NT	0.096 U	NT
Nickel (Soluble Salts)	2400	NLE	4.50	NT	5.27	NT	4.96	NT	4.21	NT	5.16	NT	4.13	NT
Potassium	NLE	NLE	3320	NT	3660	NT	4780	NT	2620	NT	5400	NT	4800	NT
Vanadium	7100	NLE	31.3	NT	37.9	NT	37.1	NT	37.0	NT	37.8	NT	37.6	NT
Zinc	1500	NLE	45.3 B	NT	42.8 B	NT	42.5 B	NT	34.5 B	NT	74.9 B	NT	43.7 B	NT

<sup>1</sup> NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D.

<sup>2</sup> NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D.

<sup>3</sup> NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern. (Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.16-3  
Fort Monmouth Phase II Site Investigation, Parcel 69  
Summary of Analytical Parameters Detected in Soil (mg/kg)

Chemical	Sample ID: Lab ID: Date Sampled: Depth (ft. bgs):		Analytical Results					
			P69SB-4A	P69SB-4B	P69SB-4C	P69SB-4C	P69SB-4C DUP	P69SB-4C DUP
			7048012	7053909	7048014	7053910	7048002	7053902
			11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007
			0.5-1.0	1.5-2.0	8.5-9.0	8.5-9.0	8.5-9.0	8.5-9.0
	NRDCSCC <sup>2</sup>	IGWSCC <sup>3</sup>	Result	Result	Result	Result	Result	Result
Volatiles								
Acetone	1000	100	NT	2.300 B	NT	2.800 B	NT	0.300 B
Methylene Chloride	210	1	NT	0.082 JB	NT	0.110 JB	NT	0.280 U
Semi-Volatiles								
Diethyl phthalate	10000	50	1.100 U	NT	1.200 U	NT	1.200 U	NT
Di-n-butylphthalate	10000	100	0.730 JB	NT	0.360 JB	NT	0.750 JB	NT
Fluoranthene	10000	100	1.100 U	NT	1.200 U	NT	1.200 U	NT
Phenanthrene	NLE	NLE	1.100 U	NT	1.200 U	NT	1.200 U	NT
Pyrene	10000	100	1.100 U	NT	1.200 U	NT	1.200 U	NT
Metals								
Aluminum	NLE	NLE	9190 B	NT	21600 B	NT	16700 B	NT
Arsenic	20	NLE	4.09	NT	5.17	NT	5.25	NT
Barium	47000	NLE	30.6 B	NT	51.3 B	NT	35.1 B	NT
Beryllium	140	NLE	0.796	NT	0.714	NT	0.608	NT
Calcium	NLE	NLE	1300	NT	795	NT	473	NT
Chromium	NLE	NLE	46.8	NT	59.4	NT	53.5	NT
Cobalt	NLE	NLE	0.837	NT	0.718	NT	0.882	NT
Copper	45000	NLE	46.8 B	NT	10.0 B	NT	10.2 B	NT
Iron	NLE	NLE	18100	NT	17800	NT	18300	NT
Lead	800	NLE	23.0 B	NT	6.69 B	NT	6.69 B	NT
Magnesium	NLE	NLE	2490	NT	2750	NT	2470	NT
Manganese	NLE	NLE	69.5	NT	88.2	NT	60.5	NT
Mercury	270	NLE	0.51	NT	0.115 U	NT	0.106 U	NT
Nickel	2400	NLE	5.52	NT	9.62	NT	9.46	NT
Potassium	NLE	NLE	3300	NT	3440	NT	2420	NT
Vanadium	7100	NLE	32.0	NT	50.0	NT	46.7	NT
Zinc	1500	NLE	55.9 B	NT	45.2 B	NT	45.9 B	NT

<sup>1</sup> NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

<sup>2</sup> NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

<sup>3</sup> NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern. (Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

**Table 3.16-4**  
**Fort Monmouth Phase II Site Investigation, Parcel 69**  
**Summary of Analytical Parameters Detected in Groundwater (µg/L)**

Chemical	Analytical Results			
	Sample ID:	P69GW-1	P69GW-1 DUP	P69GW-4
	Lab ID:	7048104	7048103	7048105
	Date Sampled:	11/21/2007	11/21/2007	11/21/2007
	Screened Interval (ft. bgs):	7-12'	7-12'	10-15'
	Quality Criteria <sup>1</sup>	Result	Result	Result
<b>Volatiles</b>				
Acetone	6000	0.85 U	0.85 U	<b>1.09 B</b>
Tetrachloroethylene	1	<b>0.97</b>	<b>1.02</b>	0.34 U
Toluene	600	0.27 U	0.27 U	<b>0.14 J</b>
<b>Semi-Volatiles</b>				
bis(2-Ethylhexyl)phthalate	3	<b>8.54</b>	<b>3.08</b>	1.28 U

<sup>1</sup> Higher of Practical Quantitation Limits (PQLs) & Groundwater Quality Criterion (GWQC) per NJAC 7:9-6, 2005.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

Bold = Analyte was detected.

Shaded = Concentration exceeds Quality Criteria.

µg/L = micrograms per liter.

Table 3.16-5  
Fort Monmouth Phase II Site Investigation, Parcel 69  
Summary of Analytical Parameters Detected in Sediment (mg/kg)

Chemical	Sample ID:		Analytical Results									
	Lab ID:		P69SD-1A	P69SD-1A	P69SD-1B	P69SD-1B	P69SD-1B DUP	P69SD-1B DUP	P69SD-2A	P69SD-2A	P69SD-2B	P69SD-2B
	Date Sampled:		7048017	7053911	7048018	7053912	7048016	7053915	7048019	7053913	7048020	7053914
	Depth (ft. bgs):		11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007	11/20/2007	12/17/2007
			0.0-0.5	0.0-0.5	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	0.0-0.5	0.0-0.5	1.5-2.0	1.5-2.0
Chemical	ER-L <sup>1</sup>	ER-M <sup>2</sup>	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles												
Acetone	NLE	NLE	NT	4.000 B	NT	3.100 B	NT	3.400 B	NT	5.300 B	NT	5.600 B
Carbon disulfide	NLE	NLE	NT	0.130 J	NT	0.074 J	NT	0.069 J	NT	0.069 J	NT	0.071 J
Methylene Chloride	NLE	NLE	NT	0.160 JB	NT	0.130 JB	NT	0.110 JB	NT	0.190 JB	NT	0.210 JB
Toluene	NLE	NLE	NT	0.440 U	NT	0.023 J	NT	0.320 U	NT	0.510 U	NT	0.590 U
Semi-Volatiles												
Acenaphthene	0.016	0.500	0.500 J	NT	3.100 U	NT	3.100 U	NT	1.200 J	NT	4.600 U	NT
Anthracene	0.085	1.1	2.800 U	NT	3.100 U	NT	0.190 J	NT	6.500 U	NT	4.600 U	NT
Benzo[a]anthracene	0.261	1.6	2.800 U	NT	3.100 U	NT	0.560 J	NT	6.500 U	NT	4.600 U	NT
Chrysene	0.384	2.8	2.800 U	NT	3.100 U	NT	1.000 J	NT	6.500 U	NT	4.600 U	NT
Di-n-butylphthalate	NLE	NLE	4.800 B	NT	7.600 B	NT	4.100 B	NT	1.200 JB	NT	9.400 B	NT
Fluoranthene	0.600	5.1	0.790 J	NT	0.850 J	NT	1.200 J	NT	2.800 J	NT	4.600 U	NT
Phenanthrene	0.240	1.5	0.250 J	NT	0.650 J	NT	0.730 J	NT	6.500 U	NT	4.600 U	NT
Pyrene	0.665	2.6	1.100 J	NT	1.900 J	NT	2.200 J	NT	3.100 J	NT	4.600 U	NT
Metals												
Aluminum	NLE	NLE	7790 B	NT	8720 B	NT	7890 B	NT	41300 B	NT	12100 B	NT
Arsenic	8.2	70	2.59	NT	2.27	NT	1.85	NT	36.2	NT	6.12	NT
Barium	NLE	NLE	14.8 B	NT	23.5 B	NT	17.3 B	NT	89.6 B	NT	21.6 B	NT
Beryllium	NLE	NLE	0.876	NT	1.19	NT	1.14	NT	3.90	NT	1.36	NT
Cadmium	1.2	9.6	0.063 U		0.061 U	NT	0.064 U	NT	14.1	NT	0.087 U	NT
Calcium	NLE	NLE	1460	NT	2060	NT	1210	NT	3850	NT	1470	NT
Chromium (Total)	81	370	74.5	NT	87.6	NT	83.3	NT	345	NT	80.1	NT
Cobalt	NLE	NLE	2.05	NT	1.84	NT	2.07	NT	20.3	NT	4.61	NT
Copper	34	270	30.5 B	NT	37.3 B	NT	38.6 B	NT	203 B	NT	23.9 B	NT
Iron	NLE	NLE	23700	NT	26600	NT	26700	NT	92500	NT	33200	NT
Lead	47	218	35.9 B	NT	44.4 B	NT	53.7 B	NT	410 B	NT	44.8 B	NT
Magnesium	NLE	NLE	3550	NT	3660	NT	3480	NT	11300	NT	4130	NT
Manganese	NLE	NLE	55.4	NT	45.5	NT	39.6	NT	339	NT	93.1	NT
Mercury	0.15	0.71	0.143 U	NT	0.158 U	NT	0.148 U	NT	0.83	NT	0.217 U	NT
Nickel (Soluble Salts)	21	52	9.32	NT	8.56	NT	8.49	NT	53.1	NT	18.4	NT
Potassium	NLE	NLE	4880	NT	5900	NT	5610	NT	13900	NT	5090	NT
Silver	1.0	3.7	0.252 U	NT	0.243 U	NT	0.255 U	NT	9.99	NT	0.347 U	NT
Sodium	NLE	NLE	57.316 U	NT	55.365 U	NT	57.923 U	NT	9690	NT	5230	NT
Vanadium	NLE	NLE	45.6	NT	47.8	NT	47.1	NT	185	NT	49.6	NT
Zinc	150	410	126 B	NT	134 B	NT	140 B	NT	515 B	NT	176 B	NT

<sup>1</sup> NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Low, 1998.

<sup>2</sup> NJDEP Marine/Estuarine Sediment Screening Guidelines, Effects Range - Medium, 1998.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

Bold = Analyte detected.

Shaded = Concentration exceeds ER-L.

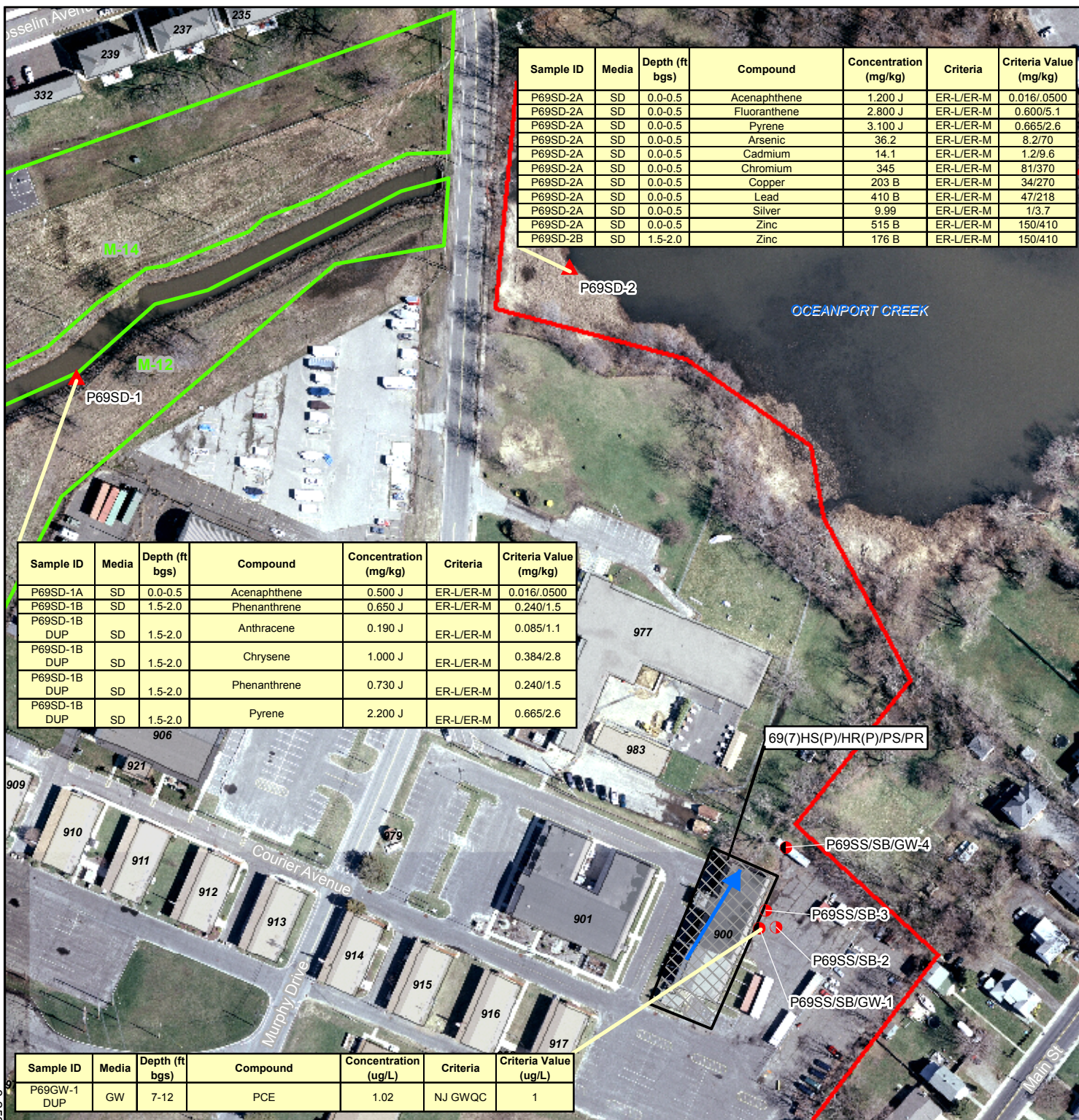
DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.



Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P69SD-2A	SD	0.0-0.5	Acenaphthene	1.200 J	ER-L/ER-M	0.016/0500
P69SD-2A	SD	0.0-0.5	Fluoranthene	2.800 J	ER-L/ER-M	0.600/5.1
P69SD-2A	SD	0.0-0.5	Pyrene	3.100 J	ER-L/ER-M	0.665/2.6
P69SD-2A	SD	0.0-0.5	Arsenic	36.2	ER-L/ER-M	8.2/70
P69SD-2A	SD	0.0-0.5	Cadmium	14.1	ER-L/ER-M	1.2/9.6
P69SD-2A	SD	0.0-0.5	Chromium	345	ER-L/ER-M	81/370
P69SD-2A	SD	0.0-0.5	Copper	203 B	ER-L/ER-M	34/270
P69SD-2A	SD	0.0-0.5	Lead	410 B	ER-L/ER-M	47/218
P69SD-2A	SD	0.0-0.5	Silver	9.99	ER-L/ER-M	1/3.7
P69SD-2A	SD	0.0-0.5	Zinc	515 B	ER-L/ER-M	150/410
P69SD-2B	SD	1.5-2.0	Zinc	176 B	ER-L/ER-M	150/410

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P69SD-1A	SD	0.0-0.5	Acenaphthene	0.500 J	ER-L/ER-M	0.016/0500
P69SD-1B	SD	1.5-2.0	Phenanthrene	0.650 J	ER-L/ER-M	0.240/1.5
P69SD-1B DUP	SD	1.5-2.0	Anthracene	0.190 J	ER-L/ER-M	0.085/1.1
P69SD-1B DUP	SD	1.5-2.0	Chrysene	1.000 J	ER-L/ER-M	0.384/2.8
P69SD-1B DUP	SD	1.5-2.0	Phenanthrene	0.730 J	ER-L/ER-M	0.240/1.5
P69SD-1B DUP	SD	1.5-2.0	Pyrene	2.200 J	ER-L/ER-M	0.665/2.6

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (ug/L)	Criteria	Criteria Value (ug/L)
P69GW-1 DUP	GW	7-12	PCE	1.02	NJ GWQC	1

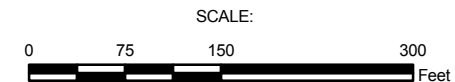
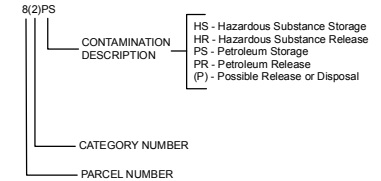
LEGEND

- Geoprobe Soil Sample Location
- Geoprobe Soil & Groundwater Sample Location
- Sediment Sample Location
- Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and pre-existing IRP site groundwater potentiometric maps where available.
- Building
- IRP Site Boundary
- Installation Boundary

ECP PARCEL CATEGORY DEFINITIONS

- Areas that are not evaluated or require additional evaluation.

BRAC PARCEL LABEL DEFINITIONS



Base Realignment and Closure 2005



Shaw Environmental, Inc.



FIGURE 3.16-1  
FORT MONMOUTH ECP  
SITE INVESTIGATION  
PARCEL 69 SAMPLE LOCATIONS  
AND CONSTITUENTS OF CONCERN  
MAIN POST  
FORT MONMOUTH  
NEW JERSEY